

Application No. 10/673,251
Amendment filed June 17, 2004
Reply to Office Action dated March 17, 2004

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Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A method for fabricating a light-emitting device, the method comprising:

(a) sequentially forming a first compound semiconductor layer, an active layer, and a second compound semiconductor layer, which are for inducing light emission, on a high-resistant substrate;

(b) forming a light-transmitting conductive layer on the second compound semiconductor layer;

(c) dry etching a region of the high-resistant substrate using a reaction gas comprising at least Cl₂ or BCl₃ to expose the first compound semiconductor layer; and

(d) forming a high-shielding light-shielding conductive layer to cover the exposed region of the first compound semiconductor layer.

Claim 2 (original): The method of claim 1, wherein step (c) comprises:
polishing the bottom of the high-substrate; and
exposing the bottom of the first compound semiconductor layer by etching the region of the high-resistant substrate.

Claim 3 (original): The method of claim 2, wherein the high-resistant substrate is a sapphire substrate.

Claim 4 (original): The method of claim 2, wherein the bottom of the high-resistant substrate is polished by grinding or lapping.

Claim 5 (canceled).

Claim 6 (currently amended): The method of claim [5] 1, wherein the reactant gas further comprises Ar gas.

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Claim 7-8 (canceled).

Claim 9 (original): The method of claim 2, wherein the high-resistant substrate is etched to form a via hole through which the bottom of the first compound semiconductor layer is exposed.

Claim 10 (currently amended): The method of claim 2, wherein the high-resistant substrate is etched to expose a portion of the bottom of the first compound semiconductor layer that is larger than a portion of the first compound semiconductor layer that remains in contact with ~~remove the remaining region other than the region of the high-resistant substrate after etching~~.

Claim 11 (original): The method of claim 1, further comprising forming a pad layer on the light-transmitting conductive layer.

Claim 12 (original): A method for fabricating a light-emitting device, the method comprising:

(a) sequentially forming a first compound semiconductor layer, an active layer, and a second compound semiconductor layer, which are for inducing light emission, on a high-resistant substrate;

(b) forming a light-reflecting conductive layer on the second compound semiconductor layer;

(c) etching a region of the high-resistant substrate to expose the first compound semiconductor layer; and

(d) forming a light-transmitting conductive layer to cover the exposed region of the first compound semiconductor layer.

Claim 13 (original): The method of claim 12, wherein step (c) comprises:
polishing the bottom of the high-resistant substrate; and
exposing the bottom of the first compound semiconductor layer by etching the region of the high-resistant substrate.

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Claim 14 (original): The method of claim 13, wherein the high-resistant substrate is a sapphire substrate.

Claim 15 (original): The method of claim 13, wherein the bottom of the high-resistant substrate is polished by grinding or lapping.

Claim 16 (original): The method of claim 12, wherein the high-resistant substrate is dry etched using a reaction gas comprising at least Cl₂ or BCl₃.

Claim 17 (original): The method of claim 16, wherein the reactant gas further comprises Ar gas.

Claim 18 (original): The method of claim 13, wherein the high-resistant substrate is dry etched using a reaction gas comprising at least Cl₂ or BCl₃.

Claim 19 (original): The method of claim 18, wherein the reactant gas further comprises Ar gas.

Claim 20 (original): The method of claim 13, wherein the high-resistant substrate is etched to form a via hole through which the bottom of the first compound semiconductor layer is exposed.

Claim 21 (currently amended): The method of claim 13, wherein the high-resistant substrate is etched to expose a portion of the bottom of the first compound semiconductor layer that is larger than a portion of the first compound semiconductor layer that remains in contact with ~~remove the remaining region other than the region of the high-resistant substrate after etching~~.

Claim 22 (original): The method of claim 12, further comprising forming a pad layer on the light-transmitting conductive layer.

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Claim 23 (currently amended): A method for fabricating a light-emitting device, the method comprising:

- (a) forming a material layer for lasing on a high-resistant substrate;
- (b) forming a first electrode on the material layer;
- (c) dry etching a region of the high-resistant substrate using a reaction gas comprising at least Cl₂ or BCl₃ to expose a region of the material layer; and
- (d) forming a second electrode on the bottom of the high-resistant substrate to cover partially or fully the exposed region of the material layer.

Claim 24 (original): The method of claim 23, wherein step (a) comprises:
sequentially forming a first compound semiconductor layer, a first cladding layer, a resonator layer, a second cladding layer, and a second compound semiconductor layer on the high-resistant substrate;
forming a mask pattern on the second compound semiconductor layer to cover a predetermined region of the second compound semiconductor layer;
sequentially patterning the second compound semiconductor layer and the second cladding layer using the mask pattern as an etch mask, the second cladding layer into a rigid form;
removing the mask pattern; and
forming a passivation layer on the second cladding layer patterned into the ridge form, in contact with a region of the patterned second compound semiconductor layer.

Claim 25 (original): The method of claim 24, wherein step (c) comprises:
polishing the bottom of the high-resistant substrate; and
exposing the bottom of the first compound semiconductor layer by etching the region of the high-resistant substrate.

Claim 26 (original): The method of claim 25, wherein the high-resistant substrate is a sapphire substrate.

Claim 27 (original): The method of claim 25, wherein the bottom of the high-resistant substrate is polished by grinding or lapping.

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Claim 28-30 (canceled).

Claim 31 (currently amended): The method of claim 29 24, wherein the reactant gas further comprises Ar gas.

Claim 32 (original): The method of claim 25, wherein the high-resistant substrate is etched to form a via hole through which the bottom of the first compound semiconductor layer is exposed.

Claim 33 (currently amended): The method of claim 25, wherein the high-resistant substrate is etched to expose a portion of the bottom of the first compound semiconductor layer that is larger than a portion of the first compound semiconductor layer that remains in contact with ~~remove the remaining region other than the region of the high-resistant substrate after etching~~.

Claim 34 (original): The method of claim 24, wherein the resonator layer is formed by sequentially forming a first waveguide layer, an active layer, and a second waveguide layer on the first cladding layer.

Claim 35 (original): The method of claim 23, wherein step (d) comprises:
forming an ohmic contact layer on the bottom of the high-resistant substrate to cover partially or fully the exposed region of the material layer; and
forming a thermal conductive layer on the ohmic contact layer.